

## CLAIMS

We claim:

1. A method for identifying the orientation of an interesting object (IO) in a digital medical image, the method comprising the steps of:
  - a) creating a rectangular interesting image mask that covers said interesting object from original digital medical image;
  - b) generating a rough image based on said interesting image mask, the rough image coarsely describing the interesting object; and
  - c) identifying the orientation of said interesting object based on the rough image.
2. The method of claim 1, wherein said interesting object is an anatomical region.
3. The method of claim 1, wherein said interesting image mask is one of: manually selected by a user; automatically selected by a program; and generated by another system.
4. The method of claim 1, wherein the size of the interesting image mask is the same as that of the digital medical image.
5. The method of claim 1, wherein said rough image is a binary image, and wherein said step of generating a rough image comprises the step of using unsupervised learning techniques to segment said interesting object.

6. The method of claim 5, wherein said step of using unsupervised learning techniques further includes the steps of:
  - using a clustering technique;
  - using a thresholding technique; and
  - using a self-organizing technique.
7. The method of claim 1, further including the use of one or more heuristic rules.
8. The method of claim 7, wherein the one or more heuristic rules are used in the step of identifying the orientation of the interesting object, and wherein the one or more heuristic rules compare features extracted from said rough image.
9. A system that performs identification of the orientation of an interesting object in digital medical image, the system comprising:
  - a digitizer system;
  - a computer system; and
  - a computer-readable medium containing software implementing the method of claim 1.
10. A method for segmenting interesting objects (IO) in digital medical images, the method comprising the steps of:
  - a) creating a rectangular interesting image mask that covers said interesting object from an original digital medical image;

- b) generating a rough image based on said interesting image mask, the rough image coarsely describing said interesting object; and
  - c) performing a post-process on said rough image.
- 11. The method of claim 10, wherein said interesting object is an anatomical region.
  - 12. The method of claim 10, wherein said interesting image mask is one of: manually selected by a user; automatically selected by a program; and generated by another system.
  - 13. The method of claim 10, wherein the size of the interesting image mask is the same as that of original medical image.
  - 14. The method of claim 10, wherein said rough image is a binary image; and wherein said step of generating a rough image comprises using unsupervised learning techniques to segment said interesting object.
  - 15. The method of claim 14, wherein said step of using unsupervised learning techniques further includes the steps of:
    - using a clustering technique;
    - using a thresholding technique; and
    - using a self-organizing technique.
  - 15. The method of claim 10, wherein said step of performing a post-process comprises the steps of:
    - a) searching landmark points; and
    - b) trimming a boundary and removing noise.

16. The method of claim 10, wherein said post-process is based upon the rough image.
17. The method of claim 16, wherein said step of searching landmark points includes at least one of the steps of:
  - searching top edge points and bottom edge points of the interesting object; and
  - searching left edge points and right edge points of the interesting object.
18. The method of claim 16, wherein said step of trimming a boundary and removing noise further includes:
  - (a) searching edge points of the interesting object; and
  - (b) using one or more heuristic rules.
19. The method of claim 18, wherein a region of searching edge points used in said step of searching edge points is from top edge point to bottom edge point in the vertical direction, and from left edge point to right edge point in the horizontal direction.
20. The method of claim 18, wherein the one or more heuristic rules used in the step of trimming boundary and removing noise include the steps of:
  - using common logic inference; and
  - comparing the interesting object in the rough image with a real object.

21. A system for segmenting interesting objects (IO) in digital medical images, the system comprising:

- a digitizer system;
- a computer system; and
- a computer-readable medium containing software implementing the method of claim 10.